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PROBLEM DIFFERENTIATION IN A FAMILY PRACTICE RESIDENCY PROGRAM

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A handwritten signature in black ink, reading "William J. Cairney". The signature is fluid and cursive, with the first name "William" and last name "Cairney" clearly legible.

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Director of Medical Education:
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PROBLEM DIFFERENTIATION IN A FAMILY PRACTICE RESIDENCY PROGRAM

ABSTRACT:

Problem differentiation is an essential part of family practice. It is the process of evaluating poorly defined or unorganized patient complaints and developing a logical medical assessment plan. Problem differentiation is a critical skill for the family practitioner because most patients encounter the medical system first through their family physicians. This task is made more difficult by the limited time family physicians have with their patients and by the growing emphasis on prudent use of diagnostic testing and specialty referral. By following a basic problem differentiation curriculum format in conjunction with companion educational experiences, family practice residents can greatly improve these important skills. Resident and program evaluation are integral components of the process.

INTRODUCTION:

Problem differentiation is the process of evaluating poorly defined or unorganized patient complaints¹ and developing a logical medical assessment plan. This is a common task for the family practitioner, as many patients first encounter the medical system through their family doctor. Complaints such as fatigue or chest pain may represent one or several co-existing medical states, all of which must be thoroughly evaluated by the treating physician. Making this task more difficult is the limited time family physicians have with their patients in an office setting, and the growing emphasis on prudent use of diagnostic testing and specialty referral.

By teaching family practice residents how to develop skills in problem differentiation, residency programs can help graduate physicians to improve the level of care they provide to their patients, as well as teach graduates how to evaluate patients efficiently. Problem based learning is also felt to improve self directed learning², thereby preparing residents for a lifetime of continuing medical education. The following paper discusses a basic problem differentiation curriculum format, educational experiences developed to teach residents problem differentiation, an evaluation process for residents designed to assess their problem differentiation skills, and a program evaluation system designed to evaluate the effectiveness of a problem differentiation curriculum.

Problem Differentiation: Development of Problem Differentiation Skills

Problem differentiation is the process of taking an undifferentiated patient problem and evaluating that problem in a logical and meaningful manner. Patient problems usually present in one of two ways: 1) a patient symptom; or 2) a physical sign. In the former case, the patient experiences some discomforting symptom, such as chest pain or fatigue, and seeks medical care to determine the cause of that complaint. Physical signs may represent an observation on the part of the patient (i.e., fever), an observation on the part of the physician (i.e., detection of a heart murmur), or an abnormal result on a diagnostic test (i.e., elevated liver function tests).

Although physicians are taught to evaluate a problem and to try to determine its etiology on one presentation, this is often not possible when the complaint is vague or represents a disease state not previously seen by the physician. In such cases, a *process* of problem differentiation must take place. In our resident clinic training experience, we have identified five skills useful in this process: 1) A universal problem evaluation approach; 2) Interviewing skills to help in problem identification; 3) Use of decision making trees in the development of a patient evaluation plan; 4) Ordering and interpreting diagnostic tests; and 5) Longitudinal patient evaluation as a means of problem identification and differentiation. This *does not* mean we want our residents to pursue an expensive and costly differential diagnosis evaluation. One criticism of problem based learning is that medical students and residents tend to develop an extensive differential diagnosis which is

too expansive to lead to an effective medical evaluation³. What we want is our residents to be familiar with life-threatening and organ threatening illnesses, and to identify them through a quick examination and directed questioning.

Development of a universal evaluation approach. Perhaps the most difficult part of the problem differentiation process is determining a starting point. When a patient complains of chest pain, should you get an EKG first, determine pertinent risk factors, or begin with the most prevalent disease states for that patient's age and sex? To help our residents determine a starting point, we begin the problem differentiation process by first identifying life-threatening and then organ threatening conditions, and then proceeding to those diseases which affect well-being. Residents are first asked to identify whether a patient is medically stable, and if so, to proceed with a directed interview (see below), and an examination focusing on the presence of serious illness. For example, a patient seen for knee pain should be examined for the possibility of a septic joint in addition to the evaluation for the more common causes of joint pain. This can often be done by physical evaluation alone, requiring no further diagnostic testing, unless it is indicated.

Development of resident interviewing skills. With the growing emphasis on cost containment, patient interviewing is becoming increasingly important. We therefore are teaching our residents to interview their patients to obtain what we term *critical* information, that is information important in decision making. For example, in the patient with chest pain it is critical to determine if a patient is at risk for heart disease, pulmonary embolism, and thoracic aneurysm. Has the patient had any of these illnesses before, or have they previously been evaluated for them? Have they ever had a cardiac catheterization, or treadmill test? Is there a family history of aneurysm, or does the patient have vascular disease? Have they ever had a deep vein thrombosis? The purpose of the patient interview is then to begin the problem differentiation process from which a decision making flow chart or tree may be determined.

Use of decision making trees in the development of a patient evaluation plan. Decision making trees or flow sheets are designed to improve decision making, not replace it. These flow diagrams help physicians to think in a logical sequence rather than working up one particular diagnosis and then starting over, if that diagnosis does not prove to be the cause of the patient's complaints. Currently, our program uses medical decision making trees available in *Decision Making in Medicine*⁴, *Decision Making in Pain Management*⁵, and *Patient Care Flow Charts on Diskette*⁶. Residents are encouraged to modify or update these flow sheets to reflect current medical knowledge and diagnostic testing. We also encourage residents to develop their own flow charts for problems not represented in these resources. In addition to helping physicians to develop the process of problem differentiation, flow charts provide a rapid summary of the investigative process, which other treating physicians can quickly refer to when asked to see the patient being evaluated.

Development of resident skills in ordering and interpreting diagnostic tests. Although diagnostic tests can themselves present a problem differentiation exercise, they may be needed in the assessment of a patient's problem. It is paramount for residents to use these tests efficiently and effectively if they are to rapidly and cost effectively evaluate a patient's sign or symptom. Residents are taught which tests give the answers they are seeking, what may cause a test to be falsely positive or negative, and how to interpret tests for themselves and not to simply rely on another's interpretation. For example in a patient presenting with chest pain, an EKG may or may not prove helpful if the patient is experiencing an early myocardial infarction. The resident must use the information gathered from the EKG along with other information to come to a diagnostic conclusion. Similarly, residents are taught the full scope of diagnostic tests, such as using the EKG to detect left ventricular or atrial hypertrophy in the hypertensive patient, and not simply for use in the evaluation of chest pain.

Longitudinal patient evaluation. Perhaps one of the greatest diagnostic tools a family physician has at his or her disposal is the opportunity to evaluate a patient over a long period of time. Clinical syndromes or disease states often do not manifest themselves overnight, but gradually

over a period of time. By following a patient sequentially, a physician might observe subtle changes in a person's pathophysiology which herald the underlying disease process. Such observations are sometimes needed to determine early angina, or the presence of an early malignancy. Although no one diagnostic test can determine the presence of Alzheimer's disease, careful observation of memory loss and changes in patient behavior can help the treating physician identify these disease in an early stage.

Problem Differentiation: Educational Exercises

Because most residents are unfamiliar with the concept of problem differentiation, we have found case presentations to be extremely helpful in teaching problem differentiation techniques. Case presentations not only help in explaining the concept of problem differentiation, but allow us to show residents how to incorporate the five problem differentiation skills into a patient evaluation. Residents are presented a case representing a patient complaint such as chest pain, and then are asked to develop an evaluation strategy for the case presented. Again, residents are reminded to first stabilize the patient, rule-out life-threatening disease, and then develop an evaluation plan. Residents are then asked to develop appropriate interviewing questions to better define the patient's problem. Once these questions have been answered, residents are asked to develop a diagnostic scheme. EKGs, x-rays, PFTs and laboratory tests from actual clinic patients are then presented for resident review. Based on these findings residents are asked to determine an appropriate treatment plan and patient re-evaluation schedule. At the completion of the case review, residents are asked to summarize their evaluation and recommendations in a decision making flow chart or tree. The case discussion then continues into a lecture format where a particular diagnostic testing procedure is discussed in detail. Case presentations are based on common patient complaints seen in our family practice clinic, so that lecture materials are reinforced by actual clinical experience.

Future developments include videotaping of actual patient interviews and reviewing them with residents to help them become more proficient in the directed patient evaluation. We are also looking into the development of patient simulation seminars, similar to ACLS mock codes, designed to help residents "rehearse" problem differentiation protocols for various clinical presentations.

Problem Differentiation: Clinical Experiences

Like the problem differentiation educational programs discussed above, clinical educational experiences have been established to develop problem differentiation skills. Out rotations in clinics and the hospital are designed primarily to provide exposure to a large number of patients representing common medical presentations and to develop specific skills such as interpreting EKGs. Longitudinal rotations in our family practice clinic are where residents are taught to integrate patient evaluation skills into logical and efficient plans.

For patients seen in our clinic, residents are taught to evaluate patient complaints thoroughly and logically. Before diagnostic tests are ordered, indications, contraindications and clinical effectiveness of each are discussed with the presiding faculty physician. In cases where no clear cut diagnosis is apparent, residents are asked to place patient complaints in either *The Problem Knowledge Coupler*⁷, or *Quick Medical Reference*⁸, two computer diagnosis programs, or refer to the decision making tree resources listed earlier.

In addition to clinical experiences in patient evaluation and problem differentiation, we have developed rotations to help familiarize residents with diagnostic imaging and testing. Residents

spend time interpreting imaging studies with local radiologists, interpreting EKG's with hospital cardiologists, and interpreting pulmonary function tests with local pulmonologists.

Resident Evaluation

Resident evaluation is based on: 1) Preceptor observation and case discussion; 2) Chart review; and 3) Participation in case reviews. Preceptor observation is made by faculty on site (at our family practice clinic) and by preceptors on out rotations. Residents are encouraged to discuss cases involving complex evaluations and decision making and to incorporate flow sheets directly into the patient charts. These flow charts are then reviewed as part of our monthly Continuous Quality Improvement (CQI) program. This review is particularly important in cancer screening programs, such as evaluation of breast masses, or evaluation of the abnormal pap smears.

Participation in case presentations is determined by supervising faculty and in-service examinations. These evaluations stress the resident's ability to develop a problem-differentiation process, not simply the ability to memorize a particular clinical protocol.

Program Evaluation

Program evaluation is based on 1) The program's ability to meet educational goals, 2) The program's ability to prepare graduate physicians for real-life practice, and 3) Performance on the ACFP's National Board examination. Evaluation of the program's ability to meet educational goals is through review of resident faculty evaluations and resident self-evaluations. Failure to note resident progress in a particular skill by any reviewer indicates either ineffective teaching or lack of clinical exposure. Preceptors for out rotations are also asked at the end of each resident's rotation to comment on the resident's basic skills upon entering that rotation. Lack of resident preparation, particularly in problem differentiation skills, indicates the need for more patient simulation/case review lectures and better clinical exposure.

Of equal importance is an evaluation of the program's ability to prepare physicians for the life-long task of problem differentiation. We are currently developing a questionnaire which will be sent to graduate physicians asking them if the teaching we provided was adequate for their current practice situation. Similar questionnaires have been used with good success to evaluate resident training in graduates⁹. We will ask residents if they feel comfortable dealing with problem differentiation situations, such as the evaluation of chest pain, and whether we should develop new curriculum modules other than those listed on the questionnaire. We also hope to develop a similar questionnaire for those medical groups employing our graduates such as hospitals and HMOs.

Ultimately the effectiveness of our problem differentiation curriculum is measured by the success our residents have in taking board certification examinations. If problem differentiation is truly essential to the successful practice of family medicine, these skills should help our residents perform well on the ACFP national boards. We will be using national board results as one means of refining our problem differentiation curriculum.

Summary

Problem differentiation is an essential part of family practice. Many patients present to their physician with poorly defined or poorly organized problems which the attending physician must evaluate thoroughly and efficiently. Making this process more difficult is the growing emphasis on cost containment amidst an ever-growing number of diagnostic tests.

Although problem based learning programs have been developed for medical schools, we have yet to find a problem differentiation curriculum designed to meet the needs of family practice residents. In response we have developed a problem differentiation curriculum with five basic objectives: 1) A universal problem evaluation approach; 2) Interviewing skills to help in problem identification; 3) Use of decision making trees in the development of a patient evaluation plan; 4) Ordering and interpreting diagnostic tests; and 5) Longitudinal patient evaluation as a means of problem identification and differentiation. Critical to the success of this program have been the development of appropriate educational opportunities, a resident evaluation system, and a program evaluation system.

Problem differentiation is a life-long learning experience. Continuing developments in medical knowledge and diagnostic testing will require the family physician to develop ways of utilizing these advances in an efficient and effective manner. By teaching problem differentiation as a medical skill, we hope to promote this life-long learning process.

REFERENCES

- 1 Rakel R E: *Textbook of Family Practice 4th Ed.* Philadelphia, 1990, W.B. Saunders Co. pp 402-403.
- 2 Berkson L, Problem-Based learning: Have our expectations been met? *Academic Medicine* 1993;68(10): 579-588 (October Supplement).
- 3 Benbassat J: Teaching differential diagnosis to beginning clinical student. *Am J Med* 1986; 81:562-563
- 4 Greene H, *Decision Making in Medicine*, Missouri, B.C. Decker, 1993.
- 5 Ramamurthy S, *Decision Making in Pain Management*, Missouri B.C. Decker 1993.
- 6 Patient Care Flow Charts on Diskette, Medical Economics Publishing 1(800)-526-4870, ext. 7419
- 7 Problem Knowledge Coupler Corporation 10 Mary Street. South Burlington, VT 05401 (802) 658-5351
- 8 *Quick Medical Reference*. Camdat Corporation 1111 Bayhill Drive Suite 465 San Bruno, CA 94066 (415) 588-5409
- 9 Allen H, Ten years of graduates evaluate a pediatric residency program. *AJDC* 1990; 144: 1102-1105.

Suggested Readings

- Chambers D, Toward a Competency-Based Curriculum, *Journal of Dental Education* Vol 57(11) 1973 pp 790-793.
- Dolmans D, Problem Effectiveness in a Course Using Problem-Based Learning *Academic Medicine* Vol 68(3) March 1993 pp 207-213.
- Eagle C, Effects of Tutors with Case Expertise on Problem-based Learning Issues *Academic Medicine* Vol 67(7) July 1992. pp 465-469.
- Lowry S, Curriculum Design, *BMJ* Vol 305, Dec. 5 1992. pp 1409-1411.

Paccione G, From Forms to Focus: A New Teaching Model in Ambulatory Medicine
Arch Intern Med. Vol 149, November 1989. pp 2407-2411.

Vernon D, Does Problem-based Learning Work? A Meta-analysis of Evaluation Research
Academic Medicine Vol 68(7) July 1993. pp 550-563.

Voytovich A, Knowledge, Realism, and Diagnostic Reasoning in a Physical Diagnosis Course,
Journal of Medical Education Vol 57, June 1982. pp 461-467.